energy and wavelength of the said two or more photons are identical, and as such the excitation processes are termed degenerate.

The multi-photon photo-activations of the present invention allow for a number of therapeutic end points, including those resulting from one or more of the following events: electronic excitation of the one or more agents to a higher quantum-mechanically allowed state; vibrational excitation of the one or more agents to a higher quantum-mechanically allowed state; vibronic excitation (combined vibrational and electronic excitation) of the one or more agents to a higher quantum-mechanically allowed state; and photoionization of the one or more agents. From such excited state end points, the one or more photo-activated agents are made to precipitate desired therapeutic effects, such as photodynamic killing of diseased cells, denaturation of tissue, or ablative removal of tissue.

The multi-photon photo-activation methods taught herein offer specific advantages relative to prior methods, including reduction of collateral excitation and damage along the excitation path, reduction in exposure to harmful optical wavelengths, reduction of interference from absorption and scattering processes originating from the environment surrounding the excited agent, improved treatment depths, improved efficiency of treatment, and enhanced control over location and specificity for the excited agent.

SEE ATTACHMENT

BRIEF DESCRIPTION OF THE DRAWINGS

In describing the preferred embodiments, reference is made to the accompanying drawings:

FIGURES 1(a)-(e) illustrate example energy level diagrams for typical linear and non-linear optical excitation processes;

FIGURES 2(a)-(d) illustrate typical modified Jablonski energy level diagrams for

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